

### Trend Study 22-14-03

Study site name: Antelope Mountain.

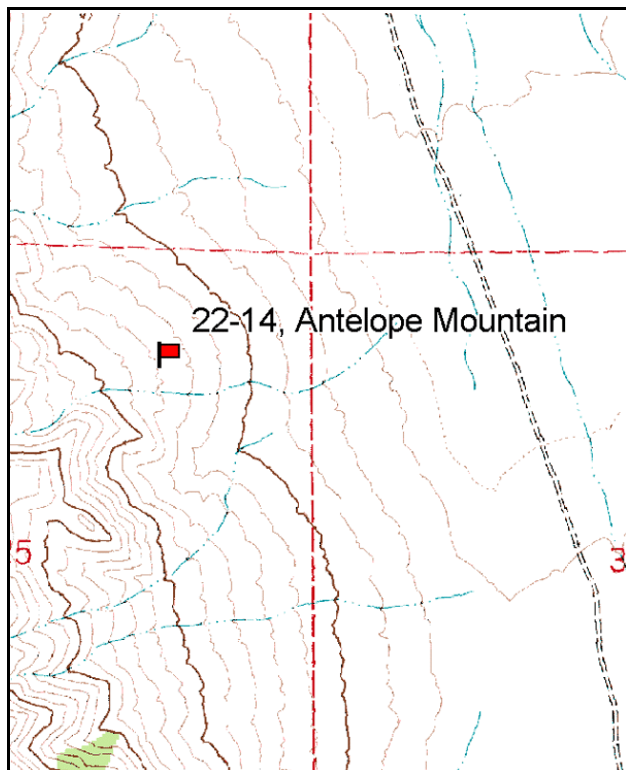
Vegetation type: Burned seeded grass.

Compass bearing: frequency baseline 180 degrees magnetic.

Frequency belt placement: line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

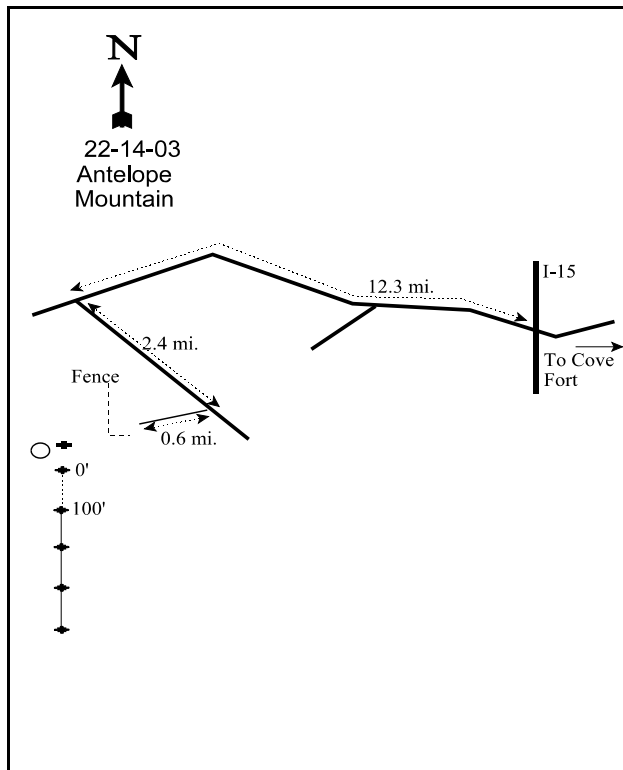
### LOCATION DESCRIPTION

From the Cove Fort exit on I-15 (a few miles north of the Junction with I-70), proceed 12.3 miles west on a gravel road staying right at one major fork. Turn left at the intersection and continue for 2.4 miles to the southwest corner of a fence. Turn right and go 0.6 miles up this faint road. This road no longer exists. Take a bearing of 233 degrees magnetic from the old fence corner to the site. Then walk or drive off road to a witness post near a large rock. The 0-foot frequency baseline stake is 20 feet east of this rock. The baseline is marked by steel rebar posts.



Map Name: Pinnacle Pass

Township 25S, Range 9W, Section 25



Diagrammatic Sketch

GPS: NAD 27, UTM 12S 4275150 N, 342436 E

## DISCUSSION

### Antelope Mountain - Trend Study No. 22-14

This study is located on the northeast end of the Mineral Mountains. The transect was placed on a moderately steep (20-25%) alluvial fan that slopes to the east at an elevation of 5,700 feet. When the study was established in 1985, the range type was big sagebrush-grass. A fire burned the entire area in 1996 and the site was then seeded and chained. At the time of the 1991 sampling, there was little sign of recent livestock use and winter deer use was light at an estimated 14 days use/acre (35 ddu/ha). Two antler drops from mature bucks were found on the site, but use appeared to be more concentrated a few hundred yards up slope at the head of a large draw. After the fire, a pellet group transect read on site in 1998 estimated 13 deer days use/acre (32 ddu/ha) and 6 cow days use/acre (15 cdu/ha). In 2003, the pellet group transect estimated 39 elk, 5 deer, and 25 cow days use/acre (96 edu/ha, 12 ddu/ha, and 61 cdu/ha). This site has more value for elk than deer due to the loss of the browse component following the 1996 fire.

Soil analysis indicates texture to be a loam, clay loam with a neutral pH (7.1). Soil depth is moderate and pale brown in color. The effective rooting depth was estimated at 13 inches in 1998, and average soil temperature was 41°F measured at a depth of 13 inches. Soil temperature was much higher in 2003 averaging 68°F at 10 inches in depth. Higher soil temperatures in 2003 are a reflection of drought conditions and a dry soil profile. Vegetative growth may be limited due to a low amount of phosphorous (6.0 ppm) in the soil, where 10 ppm is considered minimal for normal plant development. This soil type is excessively drained and is further limited by a low water-holding capacity. Permeability is rapid and the hazard of erosion is moderate. An erosion condition class assessment completed in 2003 rated soils as stable. After the fire, percent bare ground cover increased to 19% and the combined percent cover from rock and pavement increased to 61%. Bare ground declined to less than 3% average cover in 2003, and rock and pavement cover declined as well.

Prior to the fire in 1996, mountain big sagebrush was the dominant species with the majority being lightly to moderately hedged and fairly vigorous mature plants. Thirty-five percent of the population was classified as decadent in 1985, while only 6% were categorized as young. In 1991, the population dropped 21% with young plants accounting for only 4% of the population and percent decadence increasing to 59%. No mountain big sagebrush plants were sampled in 1998 or 2003 following the burn. As stated above, this site now has more value for elk and livestock due to the dominate herbaceous component and lack of browse for wintering deer. Broom snakeweed was the most abundant browse on the site in 1998 and 2003 with an estimated density of about 1,000 plants/acre in both years. Broom snakeweed exhibited abundant seed heads in 1998, but seedling and young plants were few in 1998 and 2003. A few cliffrose were found around the site in previous years, but these were no longer there in 1998 or 2003. A few tipped over juniper skeletons are still present on the site, but it appears most trees were consumed in the burn.

Prior to the fire, Sandberg bluegrass, galleta, and bluebunch wheatgrass were the most abundant herbaceous species on the site. Following the burn and the associated rehabilitation efforts, the dominant species on the site in 1998 were crested wheatgrass and intermediate wheatgrass. Bluebunch wheatgrass and galleta remained in moderate densities. In 2003, both crested and intermediate wheatgrass significantly declined in nested frequency, while bluebunch wheatgrass and galleta remained stable. Sandberg bluegrass had the highest nested frequency value in 2003 as is significantly increased from a value of 9 in 1998 to 180 in 2003. Cheatgrass was present on the site in 1998, but wasn't a major contributor in the understory. In 2003 however, cheatgrass became the dominant herbaceous species as it provided 40% of the total vegetation cover on the site and was sampled in 98 of the 100 quadrats. Forbs continue to be quite sparse. In 1998, alfalfa, pale alyssum, Utah locoweed, and storksbill were the most abundant forbs. Overall, grass utilization was light although some intermediate wheatgrass did exhibit heavy use. Alfalfa was heavily utilized by grasshoppers which were extremely abundant in 1998. Small burnet was lightly utilized as well. In 2003, alfalfa and scarlet globemallow were the only perennial forbs sampled, and storksbill significantly increased to become

the most abundant forb. In 2003, alfalfa had been moderate to heavily utilized by Mormon crickets which were abundant on the site.

#### 1985 APPARENT TREND ASSESSMENT

The range condition and trend appears to be very similar to the situation on site 22-13. Sagebrush reproduction is limited although the plants are generally vigorous. Seedling establishment may be limited by the rocky and dry soil conditions. The soil trend appears stable.

#### 1991 TREND ASSESSMENT

The soil trend is stable due to the protective covering of erosion pavement and rock. Litter cover has increased slightly since the last reading and bare ground dropped by 56%. The trend for mountain big sagebrush is down due to a lower population density, an increase in the number of decadent plants, and increased heavy use (5% to 37%). Also, the number of plants that are in poor vigor increased (10% to 29%), and the number of young in the population declined. Trend for grasses and forbs is up due to increased sum of nested frequency values for perennial species.

##### TREND ASSESSMENT

soil - stable (3)

browse - down (1)

herbaceous understory - up (5)

#### 1998 TREND ASSESSMENT

The soil trend is downward with an increase in percent bare ground, rock, and pavement cover due to the wildfire in 1996. Erosion appears moderate at this time and is mostly due to the steepness of the slope and low protective ground cover. The key browse species, Wyoming big sagebrush, was wiped out by the fire. Broom snakeweed is currently the most abundant shrub on the site. The browse trend is down. The herbaceous understory trend is stable. Although perennial herbaceous understory sum of nested frequency is lower in 1998, the herbaceous understory appears to have established well considering the effect of the fire. Cheatgrass abundance is low and the perennial species should be able to keep it that way.

##### TREND ASSESSMENT

soil - slightly down (2)

browse - down (1)

herbaceous understory - stable (3)

#### 2003 TREND ASSESSMENT

Trend for soil is up. Vegetation cover increased and bare ground decreased. The negative aspect to the increase in vegetation cover is that most of it came from cheatgrass. Although cheatgrass is undesirable from a vegetation point of view, it does provide fair soil protection. The browse component does not have a trend because no key species are present on the site. Broom snakeweed remains stable on the site at about 1,000 plants/acre. With the loss of the browse component, this site has lost most of its value as deer winter range and has become more important for elk. Trend for the herbaceous understory is stable. Perennial grasses increased in sum of nested frequency while perennial forbs declined. Overall, perennial species remained stable in sum of nested frequency. The forb component remains sparse, while grasses, both exotic and native species, have become the dominant component on this site.

# TREND ASSESSMENT

soil - up (5)

browse - no trend (n/a)

herbaceous understory - stable (3)

## HERBACEOUS TRENDS --

Management unit 22 , Study no: 14

T y p e	Species	Nested Frequency				Average Cover %	
		'85	'91	'98	'03	'98	'03
G	Agropyron cristatum	a <sup>-</sup>	a <sup>-</sup>	c <sup>158</sup>	b <sup>108</sup>	6.78	3.00
G	Agropyron intermedium	a <sup>-</sup>	a <sup>-</sup>	c <sup>94</sup>	b <sup>49</sup>	3.18	.83
G	Agropyron spicatum	a <sup>11</sup>	c <sup>103</sup>	b <sup>58</sup>	b <sup>51</sup>	3.55	3.21
G	Aristida purpurea	-	-	2	-	.01	-
G	Bromus tectorum (a)	-	-	a <sup>47</sup>	b <sup>333</sup>	.37	11.92
G	Hilaria jamesii	b <sup>134</sup>	b <sup>105</sup>	a <sup>53</sup>	a <sup>57</sup>	2.12	1.71
G	Oryzopsis hymenoides	-	1	-	-	-	-
G	Poa secunda	b <sup>161</sup>	c <sup>211</sup>	a <sup>9</sup>	bc <sup>180</sup>	.03	3.19
G	Vulpia octoflora (a)	-	-	a <sup>-</sup>	b <sup>15</sup>	-	.02
Total for Annual Grasses		0	0	47	348	0.37	11.94
Total for Perennial Grasses		306	420	374	445	15.69	11.95
Total for Grasses		306	420	421	793	16.07	23.90
F	Alyssum alyssoides (a)	-	-	b <sup>37</sup>	a <sup>1</sup>	.08	.00
F	Astragalus utahensis	a <sup>-</sup>	b <sup>35</sup>	b <sup>26</sup>	a <sup>-</sup>	1.00	.01
F	Comandra pallida	b <sup>26</sup>	b <sup>39</sup>	a <sup>-</sup>	a <sup>-</sup>	-	-
F	Draba spp. (a)	-	-	1	-	.00	-
F	Erodium cicutarium (a)	-	-	a <sup>23</sup>	b <sup>152</sup>	.95	4.26
F	Erigeron pumilus	a <sup>4</sup>	b <sup>20</sup>	a <sup>-</sup>	a <sup>-</sup>	-	-
F	Leucelene ericoides	-	-	1	-	.00	-
F	Medicago sativa	a <sup>-</sup>	a <sup>-</sup>	c <sup>46</sup>	b <sup>17</sup>	4.86	.60
F	Phlox longifolia	a <sup>-</sup>	b <sup>19</sup>	a <sup>3</sup>	a <sup>-</sup>	.03	-
F	Sanguisorba minor	-	-	5	-	.10	-
F	Sphaeralcea coccinea	-	-	5	5	.18	.12
F	Zigadenus paniculatus	c <sup>19</sup>	b <sup>8</sup>	a <sup>-</sup>	a <sup>-</sup>	-	-
Total for Annual Forbs		0	0	61	153	1.03	4.27
Total for Perennial Forbs		49	121	86	22	6.20	0.72
Total for Forbs		49	121	147	175	7.23	5.00

Values with different subscript letters are significantly different at alpha = 0.10

BROWSE TRENDS --

Management unit 22 , Study no: 14

Type	Species	Strip Frequency		Average Cover %	
		'98	'03	'98	'03
B	Chrysothamnus nauseosus albicaulis	1	2	-	.44
B	Ephedra nevadensis	1	3	-	-
B	Gutierrezia sarothrae	27	30	1.62	.21
B	Opuntia spp.	1	0	-	-
B	Tetradymia canescens	1	0	-	-
Total for Browse		31	35	1.62	0.65

CANOPY COVER, LINE INTERCEPT --

Management unit 22 , Study no: 14

Species	Percent Cover
	'03
Chrysothamnus nauseosus albicaulis	.33
Gutierrezia sarothrae	.85

BASIC COVER --

Management unit 22 , Study no: 14

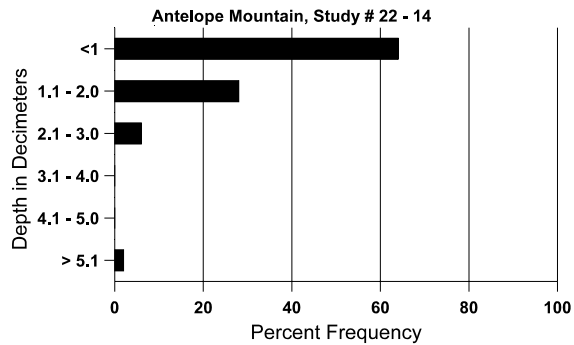
Cover Type	Average Cover %			
	'85	'91	'98	'03
Vegetation	6.25	5.00	25.04	33.26
Rock	25.50	31.75	21.07	24.05
Pavement	27.50	22.75	39.57	15.56
Litter	32.25	36.25	39.48	33.09
Cryptogams	0	0	.66	.07
Bare Ground	8.50	4.25	19.08	2.73

SOIL ANALYSIS DATA --

Management unit 22, Study no: 14, Study Name: Antelope Mountain

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	ds/m
12.9	68.0 (10.4)	7.1	36.0	37.4	26.6	2.2	6.0	201.6	0.6

## Stoniness Index



### PELLET GROUP DATA --

Management unit 22 , Study no: 14

Type	Quadrat Frequency		Days use per acre (ha)	
	'98	'03	'98	'03
Rabbit	4	17	-	-
Elk	-	12	-	39 (96)
Deer	16	6	13 (32)	5 (12)
Cattle	1	3	6 (15)	25 (61)

### BROWSE CHARACTERISTICS --

Management unit 22 , Study no: 14

		Age class distribution (plants per acre)					Utilization				
Year	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% poor vigor	Average Height Crown (in)
<b>Artemisia tridentata vaseyana</b>											
85	<b>4132</b>	-	266	2400	1466	-	35	5	35	10	18/18
91	<b>3266</b>	-	133	1200	1933	-	55	37	59	29	20/26
98	<b>0</b>	-	-	-	-	140	0	0	0	0	-/-
03	<b>0</b>	-	-	-	-	-	0	0	0	0	-/-
<b>Chrysothamnus nauseosus albicaulis</b>											
85	<b>0</b>	-	-	-	-	-	0	0	-	0	-/-
91	<b>0</b>	-	-	-	-	-	0	0	-	0	-/-
98	<b>20</b>	-	-	20	-	-	0	0	-	0	17/26
03	<b>40</b>	-	-	40	-	20	0	0	-	0	24/40

		Age class distribution (plants per acre)					Utilization				
Y e a r	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% poor vigor	Average Height Crown (in)
<i>Chrysothamnus viscidiflorus stenophyllus</i>											
85	<b>4799</b>	200	1200	2933	666	-	7	0	14	6	6/5
91	<b>266</b>	-	-	133	133	-	0	0	50	75	10/10
98	<b>0</b>	-	-	-	-	-	0	0	0	0	-/-
03	<b>0</b>	-	-	-	-	-	0	0	0	0	-/-
<i>Ephedra nevadensis</i>											
85	<b>66</b>	-	-	66	-	-	100	0	-	0	16/12
91	<b>66</b>	-	-	66	-	-	0	0	-	0	17/25
98	<b>20</b>	-	-	20	-	-	100	0	-	0	18/14
03	<b>60</b>	-	-	60	-	-	0	100	-	0	19/26
<i>Gutierrezia sarothrae</i>											
85	<b>0</b>	-	-	-	-	-	0	0	0	0	-/-
91	<b>5732</b>	-	1600	3466	666	-	0	0	12	6	7/11
98	<b>1000</b>	-	80	900	20	20	0	0	2	0	10/17
03	<b>980</b>	-	20	920	40	80	0	0	4	0	7/9
<i>Juniperus osteosperma</i>											
85	<b>133</b>	-	133	-	-	-	50	0	-	0	-/-
91	<b>66</b>	-	66	-	-	-	0	0	-	0	-/-
98	<b>0</b>	-	-	-	-	20	0	0	-	0	-/-
03	<b>0</b>	-	-	-	-	-	0	0	-	0	-/-
<i>Opuntia</i> spp.											
85	<b>66</b>	-	-	66	-	-	0	0	-	0	5/9
91	<b>66</b>	-	-	66	-	-	0	0	-	100	6/10
98	<b>20</b>	-	-	20	-	-	0	0	-	0	3/8
03	<b>0</b>	-	-	-	-	-	0	0	-	0	8/19
<i>Tetradymia canescens</i>											
85	<b>0</b>	-	-	-	-	-	0	0	-	0	-/-
91	<b>0</b>	-	-	-	-	-	0	0	-	0	-/-
98	<b>20</b>	-	-	20	-	-	0	0	-	0	9/12
03	<b>0</b>	-	-	-	-	-	0	0	-	0	28/33